

ALL-OPTICAL LINEAR FEEDBACK CIRCUIT**ABSTRACT OF THE DISCLOSURE**

An all-optical linear feedback circuit for use, for example, as a maximal
5 length pseudo random bit sequence generator includes an all-optical logic
circuit that is capable of generating 2^N-1 bit maximal length pseudo random bit
sequences on an optical channel at high data rates e.g. 80 Gbit/s. In the
pseudo random bit sequence generator of the present invention, intensity-
dependent phase modulation of at least one included semiconductor optical
10 amplifier (SOA) is implemented. The maximum data rate is limited by the fast
gain recovery time of the carriers in the SOA. An optical logic gate of the
pseudo random bit sequence generator of the present invention may be
constructed using various nonlinear elements that provide ultra-fast intensity-
dependent phase modulation.

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